

## California Monthly Climate Summary December 2012

### **Weather Highlights**

December 2012 was a wet month for California. According to the Western Region Climate Center's [California Climate Tracker](#), the monthly average temperature was 42.0°F which is 0.2°F higher than the long-term average of 41.8°F. With a statewide average of 5.86 inches, precipitation was 149% of average. The majority of this precipitation materialized in two events. Regional plots of mean temperature and precipitation rankings for the month are shown at the end of the report along with plots of the last 12 months of mean temperature and precipitation relative to the historical distribution.

December started with a series of atmospheric wave events pounding the northern part of the State. High river flows were recorded on most Northern California Rivers. Snow levels were high for these events. High pressure reasserted itself in the second week of the month bringing offshore winds and red flag warnings in the southern part of the State. The jet stream moved back over the State during the third week bringing widespread rain and snow to the Sierra. Cold air behind one low during the third week brought snow to parts of the floor of the Central Valley. The year ended with frosty mornings in the north and showers persisting in the southern part of the State.

Preliminary records, reported on the National Weather Service Record Event Report, show that statewide there were 67 temperature records tied or broken and 10 precipitation records set or tied for the month. The San Diego Weather Forecast Office recorded records on 9 days of the 21 days records were set in California for December 2012. Of the 67 temperature records set, 8 were for new high maximum temperatures and 47 were for new high minimum temperatures. For the calendar year there were 814 temperature records set and 131 precipitation records set in the State. Plots of the monthly breakdown of temperature and precipitation records are included at the end of the document. For the year, Fresno, Needles, and Death Valley all recorded their warmest year on record.

For the California Data Exchange Center's (CDEC) network of temperature gages used in this report, 225 stations recorded a minimum temperature below freezing and no stations reached or exceeded 100°F at least once during the month. Statewide extremes from the CDEC network of temperature gages are shown below. Also shown are the monthly average extremes from the CIMIS network. A table of regional average minimum, mean, and maximum temperatures from the CDEC stations is also shown at the end of the summary.

Precipitation in December was above average in the northern part of the State and below average in the Southeastern part of the State. For the CDEC precipitation gages, the largest amount of precipitation recorded was at Brush Creek in the Sacramento Basin region with 26.83 inches. This is 221% of the average precipitation for this station for the month. At the other end of the spectrum, Palm Springs recorded 0.19 inches for

the month which is 31% of average. For the CIMIS network, Brentwood in Contra Costa County topped the precipitation charts with 18.96 inches for the month and 8 stations recorded no precipitation. Some CIMIS gages may show large precipitation totals if the gages are not covered during irrigation activities so care should be given to review precipitation data used from this network.

The 8-Station Index for northern California precipitation recorded 17.1 inches in December. On average, 8.9 inches of precipitation is recorded for the 8-Station Index for the month. Statewide, the average precipitation for the month was 157% of the long-term average based on the California Data Exchange Center (CDEC) gages. Precipitation percentages by region from the CDEC gages are shown in a table at the end of this document.

### **CoCoRaHS Update**

December 2012 is part of California's 5<sup>th</sup> year with CoCoRaHS – the Community Collaborative Rain, Hail and Snow Network. This group uses citizen volunteers to record rain, hail and snow data. The users enter the data online at the CoCoRaHS web site. The web site provides the opportunity to see spatial detail of rain and snow patterns. A map from December 2<sup>nd</sup>, 2012 is shown at the end of the document. Currently, California has 973 volunteers signed up spanning 53 of California's 58 counties. The counties without volunteers are Alpine, Colusa, Glenn, Modoc, and Tuolumne. The county with the most volunteers is Sonoma with 96 volunteers. For the month of December, 12,648 reports were recorded for California. The largest daily rain total for CoCoRaHS- CA for the month was in Humboldt County where 6.35 inches was recorded on 12/2/2012. This was during an atmospheric river event that brought heavy rainfall to the northern part of the State. Two-hundred-twenty-nine snow reports were filed with the largest daily snowfall of 26 inches reported on 12/23/2012 in Placer County. Thirteen hail reports from five different Counties were entered. All reports were for hail in the rice to pea size. For more information on CoCoRaHS, please visit <http://www.cocorahs.org>.

### **Snowpack and Water Supply Conditions**

At the end of December the Northern region snowpack held 15 inches of snow water equivalent (SWE) which is 50% of the April 1<sup>st</sup> average and 139% of the average for the date. The Central region SWE was reported to be 15 inches which is 50% of the April 1<sup>st</sup> average and 139% of the average for the date. The Southern region SWE was reported to be 11 inches which is 44% of the April 1<sup>st</sup> average and 138% of the average for the date. The WSI for WY2012 for the Sacramento Basin fell into the below normal category and the San Joaquin fell into the dry category. Water supply information for California can be found at [http://cdec.water.ca.gov/water\\_supply.html](http://cdec.water.ca.gov/water_supply.html). A historical listing of water year categories for both basins can be found at <http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST>.

### **Extreme Precipitation Monitoring Network**

The National Oceanographic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL), Scripps Institute of Oceanography, and the California Department of Water Resources have been working on the installation of new observing equipment to monitor characteristics of extreme precipitation events associated with atmospheric rivers. Initial data is starting to flow from this network and some data is available for the precipitation events that occurred in December of 2012. Some samples are shown here for the rainfall events that occurred between 12/1/2012 and 12/4/2012 when 45% of the monthly total of the 8-station index precipitation fell. The first image is of six snow level radar from Happy Camp, CA south to Pine Flat reservoir for the 48 hour time period from 12/1 to 12/3. The image shows the progression of the rain event from north to south with high snow lines exceeding 9000 feet at times. Ten of twelve sites with this type of instrumentation are installed and operating. The second image shows a map of atmospheric water vapor monitoring sites in California with readings from 12/2/2012. Values over 3 cm extend from the Bay Area inland to the Sierra Nevada showing the width and direction of the main moisture paths associated with this event. The sharp gradient at the northern end of the event is also visible. More information from this network will be presented in the coming months. Data can be viewed on the NOAA ESRL website: <http://hmt.noaa.gov>.

### **Drought Monitor and Seasonal Outlook**

The maps for California for November 27, 2012 and December 25, 2012 are shown below. The Drought Monitor maps can be found on the National Drought Mitigation Center's (NDMC) website <http://drought.unl.edu/dm/>. These maps are largely a reflection of precipitation and soil moisture deficit estimates. As of the December 25<sup>th</sup> depiction, 0.05% of the State is depicted in the D3 or extreme drought category, 25.17% of California is depicted in the D2 or severe drought category, 30.97% of California is depicted in the D1 or moderate drought category. An additional 12.87% of the state is depicted as D0 or abnormally dry. Maps are updated weekly.

The U.S. Seasonal Drought Outlook for January through March from NOAA depicts California with persisting drought conditions throughout the parts of the State depicted in drought by the US Drought Monitor. This forecast is based primarily on climatology and forecast models. Visit [http://www.cpc.noaa.gov/products/expert\\_assessment/seasonal\\_drought.html](http://www.cpc.noaa.gov/products/expert_assessment/seasonal_drought.html) for more information. Updates are provided twice per month.

For more information on water conditions in California, visit <http://www.water.ca.gov/waterconditions/>. A table showing end-of-December reservoir storage by hydrologic region is shown at the end of this document.

## **ENSO Conditions and Long-Range Outlooks**

The El Niño/Southern Oscillation (ENSO) has transitioned to neutral conditions. Equatorial sea surface temperature anomalies for the tropical Pacific have moved towards negative values with the Niño 3.4 region posting a reading of -0.4°C anomaly at the end of December. The October through December 3-month running mean of the Ocean Niño Index (ONI) is 0.4. Five consecutive ONI values need to be above the 0.5 threshold need to be observed for classification as an El Niño event (five consecutive values below the threshold of -0.5 for conditions to be classified as a La Niña event). Most forecast models have the tropical sea surface temperatures remaining in neutral conditions through the first half of 2013. More information can be found at the Climate Prediction Center's web site: [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/). Updates are posted weekly. The latest three month outlook (January through March) from NOAA indicates equal chances of above average, near average, or below average temperatures for the whole State except the Lahontan and Colorado River Desert regions which are expected to have a greater chance of above-normal temperatures. For precipitation, equal chances of above, near, or below normal precipitation are forecast for the northern part of the State while the southern part of the State is forecast to have an increased probability of below normal precipitation. Outlook plots and discussions can be found at <http://www.wrcc.dri.edu/longrang/>. General weather information of interest can be found at <http://www.noaa.gov/>. For anomaly information please see [http://www.wrcc.dri.edu/anom/cal\\_anom.html](http://www.wrcc.dri.edu/anom/cal_anom.html).

## **Agricultural Data**

December 2012 saw harvests wind down and winter preparations continue. Cotton fields were plowed under after harvest and winter small grains fields were planted. Kiwi, pomegranate, persimmon, apples, pears, quince and late season grapes were picked. Wine grape harvest was complete. Late variety walnut harvests finished. Nut post harvest activities were ongoing. Vegetable harvests of eggplant, cucumbers, peppers, squash, tomatoes and other vegetables continued. Winter vegetable planting began with some fields already starting to emerge. Range conditions showed signs of improvement with rainfall with drier, poor conditions persisting in the South. Supplemental feeding continued to increase. For further crop information see <http://www.nass.usda.gov/index.asp>.

## **Other Climate Summaries**

[California Climate Tracker](#) (new product of Western Region Climate Center)

[Golden Gate Weather Service Climate Summary](#)

[NOAA Monthly State of the Climate Report](#)

**Statewide Extremes (CDEC)**

High Temperature – 86°F (Buttercup and Cahuilla, Colorado River Desert)

Low Temperature – -15°F (3 stations)

High Precipitation – 26.83 inches (Brush Creek, Sacramento River)

Low Precipitation – 0.0 inches (7 stations)

**Statewide Extremes (CIMIS)**

High Average Maximum Temperature – 75.4°F (Palo Verde II, Imperial County)

Low Average Minimum Temperature – 18.7°F (Big Bear Lake, San Bernardino County)

High Precipitation – 18.96 inches (Brentwood, Contra Costa County)\*

Low Precipitation – 0 inches (8 stations)

\*Sometimes irrigation water from sprinklers gets counted as precipitation if the gage is not covered.

**Statewide Precipitation Statistics**

| Hydrologic Region          | Region Weight | Basin Reporting |     |         | Stations Reporting |     |         | % of Historic Average |         |
|----------------------------|---------------|-----------------|-----|---------|--------------------|-----|---------|-----------------------|---------|
|                            |               | Basins          | Dec | Oct-Dec | Stations           | Dec | Oct-Dec | Dec                   | Oct-Dec |
| North Coast                | 0.27          | 5               | 4   | 4       | 17                 | 9   | 9       | 163%                  | 133%    |
| SF Bay                     | 0.03          | 2               | 2   | 2       | 6                  | 4   | 4       | 186%                  | 183%    |
| Central Coast              | 0.06          | 3               | 1   | 1       | 11                 | 2   | 2       | 166%                  | 144%    |
| South Coast                | 0.06          | 3               | 3   | 3       | 14                 | 12  | 10      | 99.7%                 | 76%     |
| Sacramento River           | 0.26          | 5               | 5   | 5       | 41                 | 30  | 29      | 182%                  | 170%    |
| San Joaquin River          | 0.12          | 6               | 6   | 6       | 24                 | 16  | 15      | 178%                  | 145%    |
| Tulare Lake                | 0.07          | 5               | 4   | 4       | 28                 | 12  | 11      | 144%                  | 108%    |
| North Lahontan             | 0.04          | 3               | 3   | 3       | 13                 | 10  | 10      | 207%                  | 147%    |
| South Lahontan             | 0.06          | 3               | 2   | 2       | 15                 | 3   | 3       | 21.0%                 | 74%     |
| Colorado River             | 0.03          | 1               | 1   | 1       | 6                  | 3   | 1       | 106.0%                | 19%     |
| Statewide Weighted Average | 1             | 36              | 31  | 31      | 175                | 101 | 94      | 157%                  | 135%    |

**Statewide Mean Temperature Data by Hydrologic Region (degrees F)**

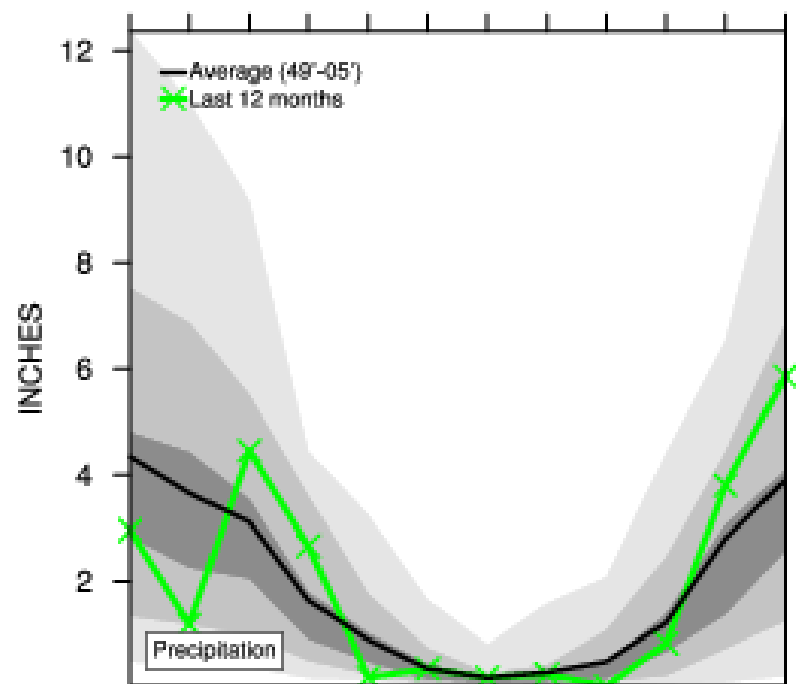
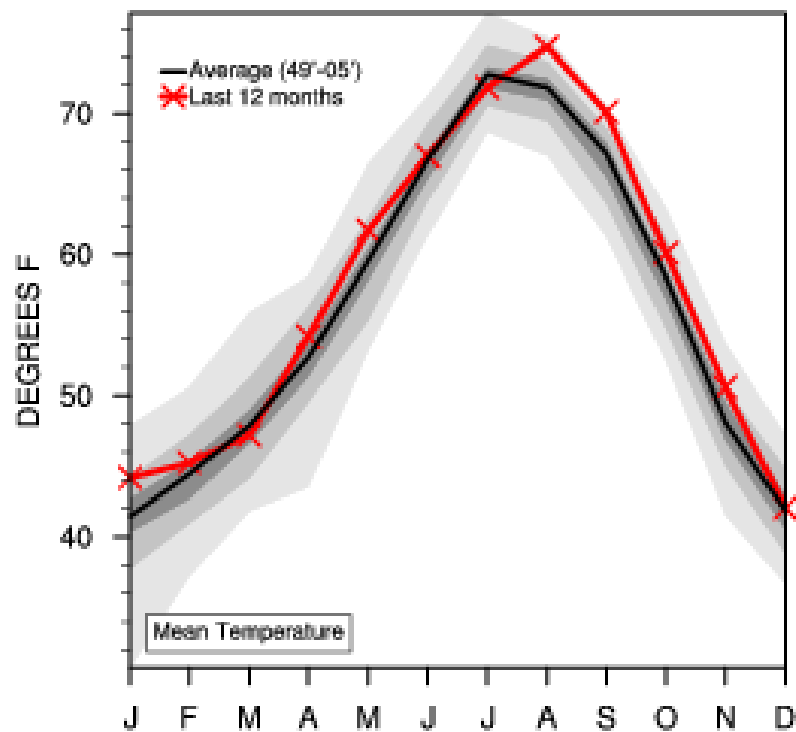
| <b>Hydrologic Region</b>   | <b>No. Stations</b> | <b>Minimum</b> | <b>Average</b> | <b>Maximum</b> |
|----------------------------|---------------------|----------------|----------------|----------------|
| North Coast                | 20                  | 21.8           | 36.3           | 59.7           |
| SF Bay                     | 10                  | 32.3           | 45.1           | 62.7           |
| Central Coast              | 12                  | 28.1           | 45.8           | 69.8           |
| South Coast                | 40                  | 30.6           | 48.9           | 74.3           |
| Sacramento                 | 73                  | 18.0           | 36.2           | 60.0           |
| San Joaquin                | 44                  | 15.6           | 35.5           | 58.5           |
| Tulare Lake                | 18                  | 8.7            | 30.1           | 54.8           |
| North Lahontan             | 26                  | 0.1            | 27.2           | 47.9           |
| South Lahontan             | 13                  | 7.2            | 32.3           | 58.9           |
| Colorado River Desert      | 6                   | 30.5           | 52.9           | 82.0           |
| Statewide Weighted Average | 262                 | 18.9           | 37.3           | 61.0           |

**End-of-December Reservoir Storage by Hydrologic Region**  
**Storage in Thousand Acre-Feet (taf)**

| <b>End-of-December Reservoir Storage</b> | <b>Number of Reservoirs</b> | <b>Average Storage (taf)</b> | <b>2012 Storage (taf)</b> | <b>% of Average</b> |
|--|-----------------------------|------------------------------|---------------------------|---------------------|
| North Coast                              | 6                           | 1,993                        | 2,338                     | 117%                |
| San Francisco Bay                        | 17                          | 423                          | 430                       | 114%                |
| Central Coast                            | 6                           | 535                          | 534                       | 100%                |
| South Coast                              | 29                          | 1,308                        | 1,231                     | 94%                 |
| Sacramento                               | 43                          | 9,826                        | 11,708                    | 119%                |
| San Joaquin                              | 34                          | 6,501                        | 6,701                     | 103%                |
| Tulare                                   | 6                           | 684                          | 456                       | 67%                 |
| North Lahontan                           | 5                           | 473                          | 603                       | 127%                |
| South Lahontan                           | 8                           | 265                          | 232                       | 88%                 |
| Total                                    | 154                         | 22,012                       | 24,290                    | 110%                |

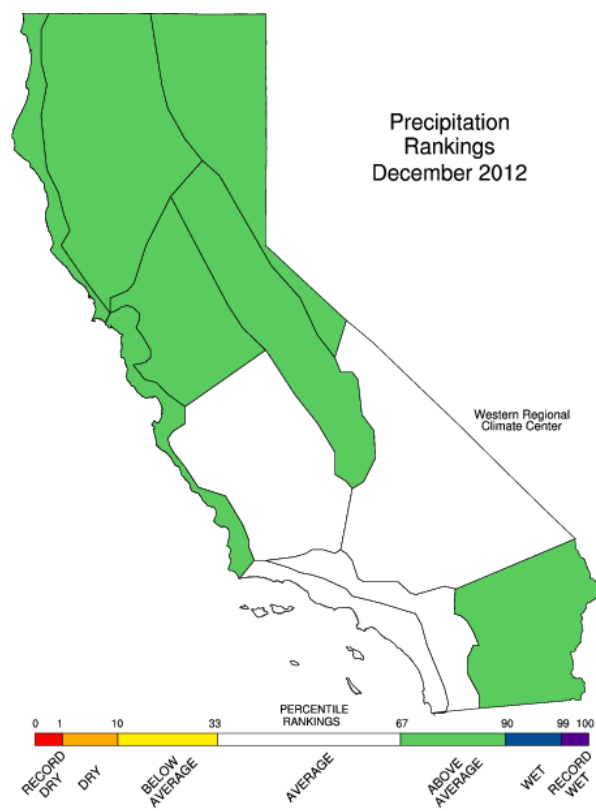
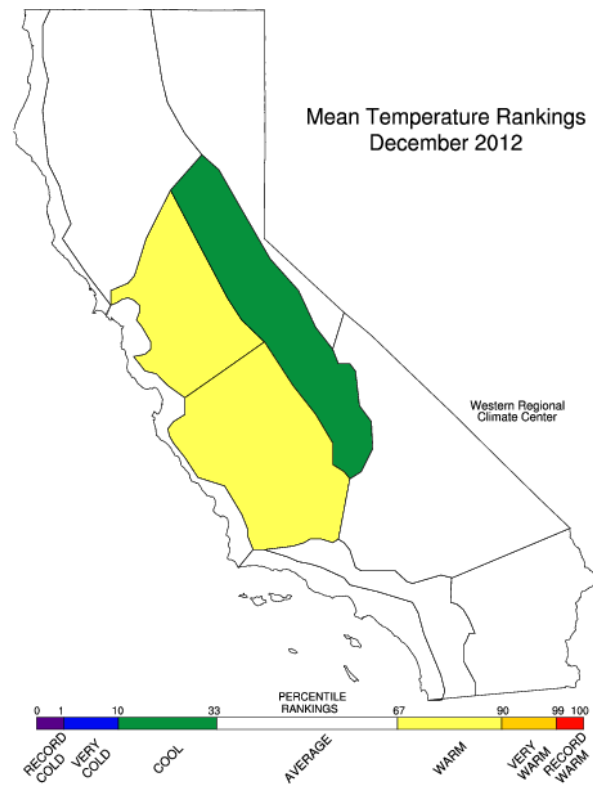
## California Climate Tracker Images

### California Statewide Last 12 Months



dark shading - 33-66 percentile  
medium shading - 10-90 percentile  
light shading - extremes

Western Regional  
Climate Center



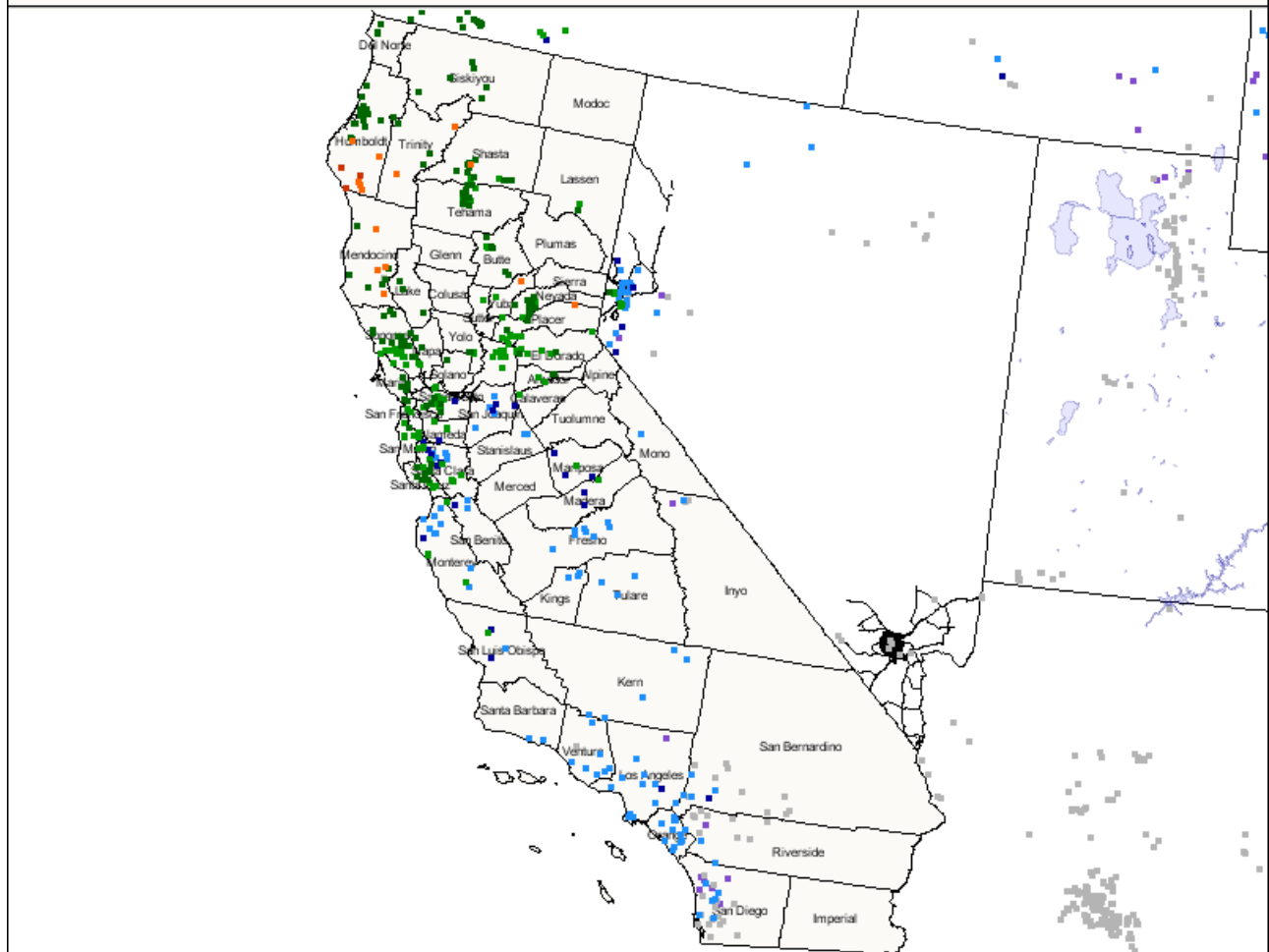


## CoCoRaHS Map

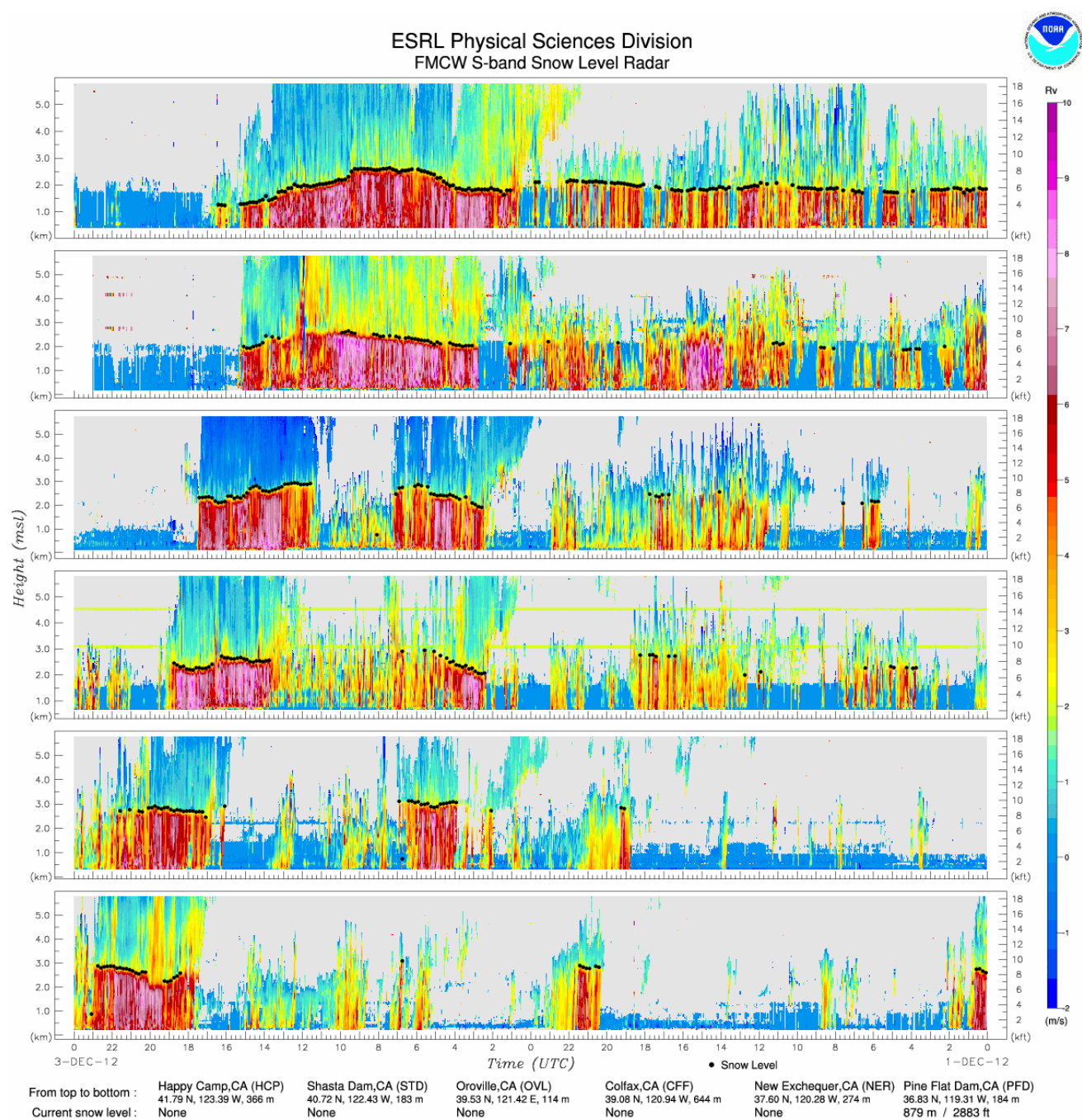
Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

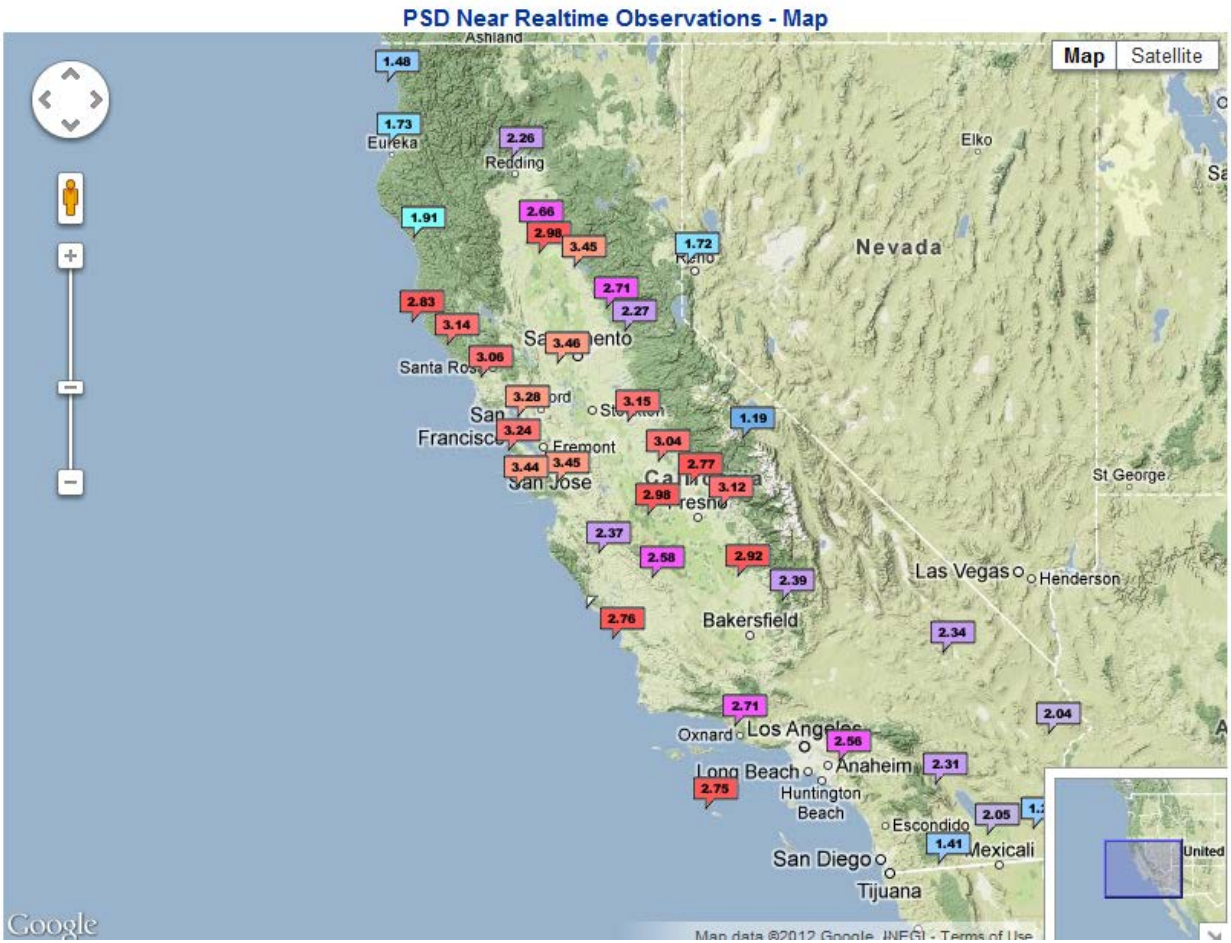
California 12/2/2012

0.0 Trace 0.01 - 0.32 0.33 - 0.64 0.65 - 1.59 1.60 - 3.81 3.82 - 5.72 5.73 - 6.35



## Extreme Precipitation Monitoring Network Images





GPS-Met readings showing integrated water vapor readings in cm on 12/2/2012 at 8:45 am PST.

# U.S. Drought Monitor

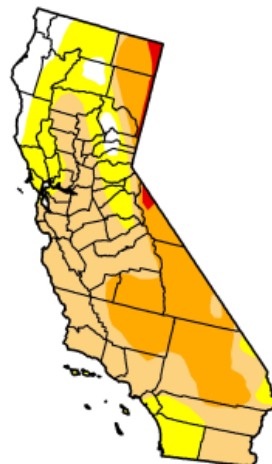
## California

November 27, 2012  
Valid 7 a.m. EST

|   | Drought Conditions (Percent Area) |       |       |       |       |      |
|---|-----------------------------------|-------|-------|-------|-------|------|
|   | None                              | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4   |
| Current                                       | 6.77                              | 93.23 | 70.47 | 28.16 | 1.14  | 0.00 |
| Last Week<br>(11/20/2012 map)                 | 4.82                              | 95.18 | 67.67 | 21.61 | 1.14  | 0.00 |
| 3 Months Ago<br>(08/28/2012 map)              | 11.74                             | 88.26 | 69.44 | 23.05 | 1.14  | 0.00 |
| Start of<br>Calendar Year<br>(12/27/2011 map) | 33.91                             | 66.09 | 5.41  | 0.00  | 0.00  | 0.00 |
| Start of<br>Water Year<br>(09/25/2012 map)    | 11.95                             | 88.05 | 69.41 | 22.27 | 1.14  | 0.00 |
| One Year Ago<br>(11/22/2011 map)              | 88.42                             | 11.58 | 0.00  | 0.00  | 0.00  | 0.00 |

### Intensity:

|                       |                          |
|-----------------------|--------------------------|
| D0 Abnormally Dry     | D3 Drought - Extreme     |
| D1 Drought - Moderate | D4 Drought - Exceptional |
| D2 Drought - Severe   |                          |



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>

# U.S. Drought Monitor

## California

Released Thursday, November 29, 2012  
National Drought Mitigation Center,

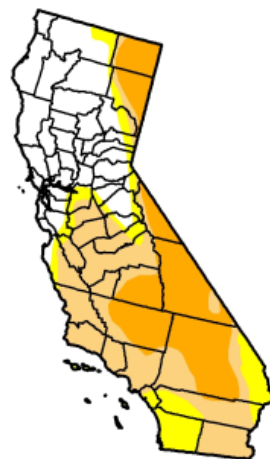
December 25, 2012  
Valid 7 a.m. EST



|   | Drought Conditions (Percent Area) |       |       |       |       |      |
|---|-----------------------------------|-------|-------|-------|-------|------|
|   | None                              | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4   |
| Current                                       | 30.94                             | 69.06 | 56.19 | 25.22 | 0.05  | 0.00 |
| Last Week<br>(12/18/2012 map)                 | 30.94                             | 69.06 | 56.19 | 26.15 | 0.05  | 0.00 |
| 3 Months Ago<br>(09/25/2012 map)              | 11.95                             | 88.05 | 69.41 | 22.27 | 1.14  | 0.00 |
| Start of<br>Calendar Year<br>(12/27/2011 map) | 33.91                             | 66.09 | 5.41  | 0.00  | 0.00  | 0.00 |
| Start of<br>Water Year<br>(09/25/2012 map)    | 11.95                             | 88.05 | 69.41 | 22.27 | 1.14  | 0.00 |
| One Year Ago<br>(12/29/2011 map)              | 71.58                             | 28.42 | 0.00  | 0.00  | 0.00  | 0.00 |

### Intensity:

|                       |                          |
|-----------------------|--------------------------|
| D0 Abnormally Dry     | D3 Drought - Extreme     |
| D1 Drought - Moderate | D4 Drought - Exceptional |
| D2 Drought - Severe   |                          |



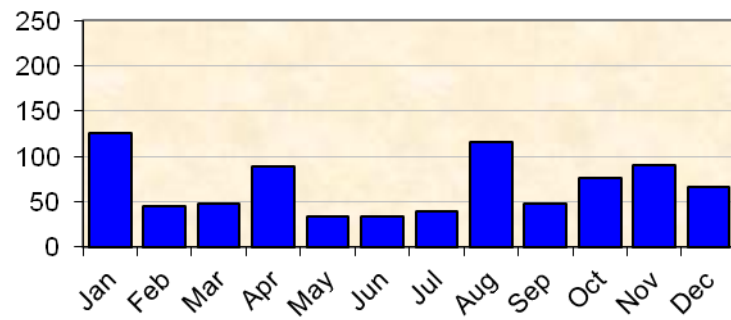
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<http://droughtmonitor.unl.edu>



Released Thursday, December 27, 2012  
Richard Heim, National Climatic Data Center, NOAA

**Temperature Records by Month for  
Calendar Year 2012**



**Precipitation Records by Month for  
Calendar Year 2012**

